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the leading principle of that book, leads inevitably to a static instead of a dynamic view of life, no matter how earnestly we try to transcend the immobility of the logical essences by introducing into them the idea of a self-repeating reflection, which can neither create anything new nor change anything old. It leads to a non-moral view of life; which is natural enough, since it begins by annihilating life. It can find no real room for either the possibility or the actuality of error, or of evil. And it reveals its fundamental absurdity in the final astounding equation of the logical order with the invisible church universal, a community instinct with the life of the Holy Spirit; than which no confusion could be more profound.

The logical order is valid and necessary; the actual order, for which the logical order furnishes in part the framework, is at one and the same time a beneficent gift and a moral task for the highest energies of free men.

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### INTELLIGENCE AND MENTAL TESTS<sup>1</sup>

**G**RATIFYING at least it is to observe that psychologists are beginning to weigh the results of work in mental tests, and to deplore in these results the almost complete absence of returns possessing permanent psychological value. And hopeful indeed is the discovery that the cause of the failure of mental testing to contribute to the development of psychology is the failure to arrive at an understanding of the nature of the materials with which the mental tester works.<sup>2</sup> At this point one is moved to comment upon the unhappy divorce between the labors of those working with mental tests, and the interpretations of the theoretical psychologist.

The writer fears that we do not carefully enough distinguish between the traditional speculative psychologist, who based his work upon assumptions, very remotely, if at all, related to concrete facts, and the theoretical psychologist who does critically evaluate concrete psychological facts, and suggests the direction of further observation of them.<sup>3</sup> Essentially, the theoretical psychologist performs the function of a consulting scientist. To deny that the theoretical scientist is a scientist because he does not himself conduct an experi-

<sup>1</sup> The thesis here presented constitutes the substance of a paper read before the Psychological Seminar in the University of Minnesota, 1916-17.

<sup>2</sup> Cf. Ruml, this JOURNAL, XVII., p. 57.

<sup>3</sup> For a statement concerning the relative position of the theoretical and practical scientist cf. Rignano, *Scientific Synthesis* (1918), Ch. 1.

ment, provided he is possessed of laboratory training, is exactly like denying that the consulting engineer is an engineer because he does not himself hold the contract to build a bridge.

The unfortunate consequence of the early assumption of the applied psychologist, namely, that it was unnecessary to define intelligence clearly, was the uncritical acceptance of the view that intelligence was a permanent entity or a complete faculty. Individuals were looked upon as analogous to chemical elements, and just as the latter were each presumed to possess a given chemical affinity for some other elements, so intelligence was conceived as a metapsychological property of the person.<sup>4</sup> In general, intelligence was looked upon as a mental force in some manner related to a body, and which adjusted the body to certain objects in contact with the body. Misguiding in the extreme appears the analogy referred to, since the valence of a chemical element is not an occult power, but a fact observed in the combination of elements, that is, the multiple of unit charges of positive or negative electricity which an element holds. Unfortunately, however, the infelicitous anthropomorphic attitude with which psychologists approached both the data of physics and psychology was responsible for the adoption of a completely unsatisfactory view concerning the character of intelligence. Now when we study intelligence as an observed fact we never find any absolute essence or faculty performing unique kinds of activities. Traces of such a view in current psychology are probably vestiges of the theological influence upon science, from the complete rejection of which psychology would greatly benefit.

Intelligence is really a name or a scientific category which denotes certain specific forms of definite reactions. Thus, an intelligent act or intelligent behavior is comparatively a more effective adjustment response than are other sorts. Justifiable then appears the view of some psychologists who consider volitional, voluntary, and even habit acts to be intelligent, while reflexes and original instincts are not.<sup>5</sup> In such a view, the fact of performing an act conditioned and perhaps improved by past experience constitutes an important factor in intelligence.

Possessing intelligence is, then, the fact of having acquired suitable reaction systems for the purpose of carrying out definite responses. Expertness is precisely the possession of intelligence in this sense, and expertness is a product of the interaction of an indi-

<sup>4</sup> No doubt the social psychologist would interpret the doctrine of permanent intelligence as a philosophical reflection of divine and natural rights, of accidentally invested special interests, which developed as a theoretical justification of some pecuniary, political or social *status quo*.

<sup>5</sup> This is not to say that reflexes and instincts are unconscious.

vidual with some particular kind of thing or condition. It is for this reason that we are willing and unashamed to be unintelligent or even stupid concerning facts and conditions in which we do not specialize or in which we are not interested. Says James:<sup>6</sup> "I, who for the time have staked my all on being a psychologist, am mortified if others know much more psychology than I. But I am content to wallow in the grossest ignorance of Greek."

But here the problem arises why it is that, of two individuals who stake their all upon being lawyers and who receive the same training, one becomes a better lawyer than the other. Is it because the one possesses the better innate capacity? Observations of this type require always extremely careful analysis. In the first place, when we say a better lawyer we must be careful to keep our psychological problem clear of the entangling thicket of social conditions and social judgments. We must remember that, while it may be a mark of intelligence to enlist the aids necessary to become a good lawyer and to seize upon every expedient working for social success, such facts are beside the specific problem of attaining proficiency in the understanding and the administration of legal tradition and legal enactments.

That we can not, in such a case, completely avoid this thicket of social conditions makes us pause. Nothing is more pertinent than the question as to whether it is not precisely the surrounding conditions which really make, not only for betterness in the social scale, but also for greater intelligence of any specific sort, since the surroundings offer the occasion to develop more and more relevant responses for legal situations. Moreover, is it possible to speak of intelligence at all excepting in terms of definite forms of response which have been naturally acquired in concrete interaction with definite forms of stimulating objects? As a matter of fact, when studying concrete behavior the notion of an absolute general ability becomes dissipated.

And, further, what can be meant by the *same* legal training? Is training merely a casual contact of a person with things producing an indifferent effect upon him? Rather, is it not true that any present training is a definite characteristic function of a given person because such training depends upon previous acquisition of reaction systems? For this reason it is almost impossible for two individuals to undergo the same training. This fact is clearly apparent when we consider the numerous differences in what is commonly miscalled the same environment of two people, for instance of two members of the same family. It follows then that if two persons are to have

<sup>6</sup> *Principles of Psychology*, I., 310.

the same training they must have previously acquired the same type and quantity of reaction patterns which are relevant to the present situation. In point of fact when we have separated the normal from the abnormal or feeble-minded person, that is to say, the person of poor biological stock, we can readily convince ourselves that intelligence is entirely the product of a long series of cumulative trainings.

Nor is it possible to minimize the subtlety and the effectiveness of our acquisition of reaction patterns. Perhaps this is indicated most clearly by the fact that much of such acquisition passes for inherited talent. Confusion of acquired response systems with hypothetical inherited talent is exemplified in the following case. A child from early infancy is exposed to a musical environment, in which music and its cultivation are glorified, and as a consequence develops interests, technique, sentiments, and other forms of reaction patterns making for musicianship, but, in spite of this development, is looked upon as an inheritor of musical talent.

And so if talents are essentially acquisitions we must rephrase some popular expressions so that they will more exactly conform with the facts. Actors and other men of talent are made more readily when they are born into a theatrical or other characteristic environment, than when they are brought into such an environment after having developed in some alien *milieu* which made them into anything but actors. Much light is thrown upon the intricate problems of intelligence by the consideration that certain of the factors which contribute to the making of a good actor are common to other occupations. Clear it is then that the individual previously a machinist can not receive the same training from an identical law course as the individual who spent the corresponding time in the study of political and social history.<sup>7</sup> And so while the machinist is inferior in legal intelligence we have no indication that he is deficient in native ability.

Turning for a moment to the criterion of intelligence which is probably most prevalent, namely, that intelligence enables us to adjust ourselves to new situations, let us examine what is here meant by *new*. Is it not an obvious fact that we are entirely helpless in the face of a totally new situation? Psychologists unanimously agree upon this in the dictum that we can not even conceive anything absolutely new. What our intelligence criterion really means, then, is that, having developed many forms of reaction systems by contact with surrounding objects and conditions, we can now adapt ourselves to similar situations without additional learning. The implication here is of course that the intelligent individual is one who has acquired many of these necessary reaction patterns.

<sup>7</sup> We assume of course that the student of history has profited by his study.

Paradoxical as it may seem, intelligence is so decidedly not an entity or a faculty, that we may look upon it as being precisely as much a function (in the mathematical sense) of the environment<sup>8</sup> as of the person. What is meant is this, that so little in our intelligent behavior can be traced to an original unacquired factor that we must accredit the environing circumstances with their full share in the development of intelligence. And so while it is fundamentally false, on the surface it yet seems true that women have less intelligence than men. For you can not find women who are capable of doing many kinds of work which men can do. The rapidly decreasing number of such examples offers good evidence that what the lack of intelligence means in such cases is the absence of opportunity to develop intelligence, that is to say reaction patterns to perform certain adaptations to particular kinds of stimulating objects and situations. Immigrant women are notoriously less intelligent and less able to adjust themselves to their surroundings than their husbands, provided always that the former do not become wage earners and thus embrace the opportunity to develop more intelligence. To the credit of mental tests be it said that to a considerable extent it was through them that the superstition of male superiority was exploded. And let us not forget that it was through the definite study of actual environmental opportunity for development that the metaphysical belief in the preeminence of the civilized mind was dethroned.

Also we must note that the inferiority of intelligence in women and in so-called primitive people was not a fact observed, but a religio-politico-economic pronouncement concerning the relative values of souls. The writer ventures the opinion that with the passing of a subjectivistic psychology and its replacement by an extensive study of concrete human reactions the need for a native intelligence, whether omnicompetent, multicompetent or merely unicompetent, will disappear.<sup>9</sup> Such an intelligence, whether described as a general faculty or a multiplicity of specific abilities, belongs with those mysterious elements, the instincts, to the class of psychological impedimenta which not only do not add to our understanding of psychological phenomena, but actually prevent a factual study of them.

And now we must consider what light the work on psychological tests throws upon the problem of intelligence. A study of the actual procedure and results of mental tests proves conclusively that such tests are and can only be designed to measure some performance whose achievement is the result of a previous interaction of a person

<sup>8</sup> In the sense of conditions offering opportunity for developing reaction systems.

<sup>9</sup> One of the unique products of a soul theory of intelligence is the conception of innate mental weakness with some specific superior ability.

and objects (machines—materials). It is for this reason that “no test has any significance for employment purposes until it has been tried out on employees doing exactly the same kind of work as that for which new applicants are to be tested later on.”<sup>10</sup> Illuminating in the extreme in this connection is the study of the limitations of mental tests. What must one conclude from the fact that mental tests are of no service in selecting executives? Should we say that mental tests do not attempt to measure intelligence? For surely, if they did, they could not be applied to any more directly functioning intelligence than is found in the work of an executive. But to accept this conclusion would mean giving up the whole problem of measuring intelligence, and this is impossible, for the genuine usefulness of the tests indicates that there may be degrees of intelligence, the lower ones of which may be very readily determined. Or should we say that intelligence is an unknowable thing, at least so far as tests are concerned, since tests are only useful for acts which have a definitely standardized form? To the writer it seems that the difficulty is entirely factitious and based upon the misconception that intelligence is native.

What the inapplicability of tests to the selection of executives really teaches us is, that all tests are performance tests based upon definite reaction patterns and not measures of connate capacity. Now since executive intelligence means the possession of innumerable and complex reaction systems it is entirely to be expected that the present development of tests should be still inadequate to meet the situation. And, further, the student of tests must be always unable to meet this situation if he persists in the belief that intelligence is innate, since such a view precludes the investigation of the actual contributing conditions which make possible complex human adjustments. To mention just one difficulty, the applied psychologist makes too wide a difference between moral and mental qualities, as though it were possible completely to separate these when an employment problem is under investigation. In this connection it is remarkable to observe upon what slender threads are sometimes hung the belief in an absolute intelligence factor. Thus the positive correlation between tapping, letter crossing, and other tests is presumed to be evidence of the presence of such a general intelligence factor.

To differentiate between mental tests and trade tests because the former measures native ability while the latter measures acquisition is to make an assumption not warranted by the facts of mental tests.<sup>11</sup>

<sup>10</sup> Link, *Employment Psychology*, p. 19.

<sup>11</sup> The writer finds encouraging the inclination of psychologists toward a concrete behavior view as manifest in the tendency to give up the term “mental tests” in favor of “psychological tests” to cover all work in this field of psychological application.

The fact is that the only difference between the two types of tests lies in the simplicity and definiteness of the latter. It is because the behavior investigated by the mental as over against the trade tests shows a greater complexity and variety, and is in general more difficult to study, that we may draw a definite line between the tests. One might say, then, that the difference between the intelligence of an executive and that of a machinist for a student of behavior lies in the comparative ease with which one can get an objective measure of the productivity of the latter. The writer is firmly convinced that with a larger conception of mental tests their value for the selection of executives may be vastly enhanced.

It may still be urged that the prominent individual differences to be found in persons must be sought in some unacquired quality in the person. We have already indicated that the probable source of such a view is to be found in some metapsychological prejudice rather than in observable facts. But the study of individual differences, it must be admitted, is fraught with grave perplexities, since in actual practise it is extremely difficult to ascertain clearly the precise points at which certain reaction systems constituting personal traits are actually acquired. Just how an individual has acquired a mathematical or a general scientific or a religious cast of mind is not an easy matter to determine. For the sake of science, however, we must plead for perseverance contempered with caution.

Nothing is less doubtful than that there are wide differences in intelligence, and nothing is more certain than that not every one is capable of mastering a given problem; but is this saying more than that intelligence once developed gives one an advantage in that it now can be employed? Certain it is also that the advantage one has over others in the possession of intelligence is due only to a series of concrete empirical events, once it is admitted that the persons under discussion are all of normal stock.

When once we determine to abjure the quick and easy way of accounting for the complex facts of psychological phenomena by referring them to occult causes or analogical symbols<sup>12</sup> and insist upon the study of concrete reactions, our way lies open to investigations which promise satisfactory solutions to our genuine psychological problems. In the consideration that the psychological reaction pattern is a mode of response of a living organism to complex surrounding conditions, we find the suggestion that the prepsychological<sup>13</sup> problem of individual differences lies precisely in the character of

<sup>12</sup> Such as Stern's illegitimate comparison of intelligence and electricity.

<sup>13</sup> By "prepsychological" is meant any phase of biological functioning at the basis of the specific reaction pattern.



the biological stock of the individual. Thus, for example, the neuroglandular organization of the person is of enormous influence in the determination of his psychological conduct. But although there is an inexhaustible source of such material, it is, as yet, practically untouched by scientific investigation. The same importance for the study of individual differences of action is attached to the perfection and degree of development of the receptor systems, as for example the rôle played by a specific condition of the auditory apparatus in the total complex of musical ability, or the qualities of the visual apparatus in mechanical or esthetic drawing. Not only does such information concerning the biological stock of the individual throw light upon the differentiation of persons into normal and abnormal, but it also illuminates the only possible source of inherited individual traits and differences. Undoubtedly, the complex and complete organization of the actual human individual when once known to a satisfactory degree will clear up many important problems of temperament, character, capacity, traits, and genius. The gain involved in awaiting such factual development is no less, let us repeat, than the acquisition of definite scientific information as over against unfounded and useless speculation.

In sum, the failure of the work of mental tests to yield principles leading to a wider extension of knowledge concerning psychological phenomena is due to the acceptance of the assumption that intelligence, or what is measured by the tests, is a mental factor and not a specific mode of adjustmental response. Thus scant attention is paid to the precise facts upon which the tests have their actual bearing. In consequence the work of mental testing merely leads to more work, but to no organized accomplishment of definite merit. To place emphasis upon the actual response as it can be studied will mean not only the avoidance of necessarily unfruitful attempts to seize upon a hypothetical faculty, but a positive understanding of actual psychological phenomena. The new direction which psychology would thus take would make superfluous such speculations as to whether the organization of the "mind" is such that its acts are related or unrelated. Instead, we would learn what the facts seem clearly to indicate, namely, that intelligent acts, as all psychological acts, must be *specific*; for our reaction patterns are definite, concrete responses. But, since our environment is more or less uniform and homogeneous, the acquisition of many response patterns must mean that our *general* capacity to respond to things is increased. Changes and improvements in the mode of responding to our surroundings are induced by variations in the objects and their relations, to which we find it necessary to adapt ourselves. In the

acquisition of numerous response patterns the person *ipso facto* takes on the qualities of general intelligence, among which are variety, independence, agility, and rapidity of response.

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### DR. WILDON CARR'S THEORY OF THE RELATION BETWEEN BODY AND MIND

DR. CARR'S consideration of the relation between mind and the body in his presidential address to the Aristotelian Society<sup>1</sup> places the problem in an original setting, and renders still less tenable any parallelistic explanation; I should like to offer, however, a few notes on certain difficulties which still seem to remain in spite of his thoughtful treatment.

Dr. Carr regards the interaction as occurring between two systems which are existentially completely disparate—"there is no common factor in psychical and physiological process" (p. 7). At the same time I do not think that his view of mind as independently organized, and as responding therefore always as a whole, is as new as he takes it to be,<sup>2</sup> although I feel convinced that to regard the interaction as taking place essentially between wholes is the truest method of approaching the subject.

1. But the specific arguments advanced by Dr. Carr in support of this general position seem in several respects to lack cogency. "Consciousness" he affirms, "is the manifestation of an immaterial object—the soul" (p. 9); his reason being that "to be conscious or aware of an object is not to contemplate but to recognize it. Recognition implies precognition, presupposes memory and constructive imagination" (p. 10). But if recognition thus implies precognition, plainly this again requires a cognition still prior, and so *ad infinitum*; nor does this view again agree with the basal assumption as to knowledge which is made by Croce, and which has received, as is well known, Dr. Carr's own endorsement.<sup>3</sup>

Then in rejecting the suggestion that psychical activity is as such merely a function of the brain, Dr. Carr appears to me to be unconsciously rather dogmatic; his arguments certainly go a cer-

<sup>1</sup> *Proc.* 1917-18. p. 1.

<sup>2</sup> *Cf.*, e. g., Bosanquet, *Principle of Individuality*, pp. 114, 168, 182, and the further references there. But does not Dr. Carr misinterpret Dr. Haldane's view of the body as a "perfect machine" (p. 6)? We have only to turn to p. 422 of the same volume to find him asserting that "a living organism differs from any mechanism which we can construct or conceive."

<sup>3</sup> *Cf.* *The Philosophy of Benedetto Croce*, ch. III.